

野茉莉 (*Styrax japonicus*) 栽培变种 DUS 测试指南及其资源利用研究

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摘 要: 野茉莉 (*Styrax japonicus* Sieb. et Zucc.) 是我国安息香属 (*Styrax* Linn.) 植物中分布最广的树种。目前国内野茉莉栽培品种资源缺乏较为系统的分类整理, 不但影响了各品种资源价值的全面评价以及品种无性系的再生体系建立, 而且严重制约着其资源的深度应用与推广等问题。本文通过实地调查对野茉莉栽培品种资源进行研究, 编制了我国野茉莉新品种 DUS 测试指南, 构建了野茉莉资源应用价值评价体系, 通过密码子偏好性与微卫星 (SSR) 标记对栽培品种进行遗传多样性研究。主要研究结果如下:

1. 野茉莉栽培品种较为丰富, 经分析比对得到了比较完全的数据库并建立了分类检索系统。本文构建了我国野茉莉已知品种数据库, 包括 44 个品种, 39 个表型性状指标; 通过相关性分析、主成分分析和聚类分析, 最终筛选出测试性状 37 个, 标准品种 17 个, 分组性状 5 个, 编制了野茉莉新品种 DUS 测试指南, 并编写了野茉莉种质分类检索表。

2. 经分析并验证, 建立了具有实用性的评价体系。本文基于层次分析法 (AHP) 的原理, 总结了野茉莉的各项应用特征, 从观赏性、生态学特性、经济价值潜力、资源量 4 个方面采用了 13 个具体的评价指标, 初步建立了适合野茉莉综合评价的 AHP 模型。对 44 个野茉莉栽培品种资源进行了综合评价并划分了 4 个应用类别。该模型可为安息香属的其他物种的栽培品种分类所借鉴, 可复制、可推广。

3. 野茉莉具有丰富的栽培变异类型, 其变异内在因子源自其具有明显的密码子偏好性。通过对野茉莉叶绿体基因组密码子的碱基使用模式、成因以及对最优密码子的筛选, 最终确定出影响种群的最优密码子为 UUG、CGA 两种。

4. 野茉莉栽培品种具有较高水平的遗传多样性, 具有进一步分化的可能。通过对野茉莉栽培品种 ‘朱丹’ 调查采样, 以 3 个不同环境属性 6 个培育基地的 60 份样本为材料, 筛选 4 对微卫星引物对样本进行遗传多样性指标计算, 表明野茉莉栽培品种具有较高水平的遗传多样性, 由于内在遗传因素和外界区域气候特征的影响, 不同环境属性下野茉莉栽培品种的形态呈现会有所差异, 具有再变异的可能。

关键词: 野茉莉; 栽培品种; DUS 测试指南; 遗传多样性; 安息香科

DUS Test Guidelines for Cultivated Varieties of *Styrax japonicus* and Its Resource Application Research

Abstract: *Styrax japonicus* Sieb. et Zucc. is the most widely distributed tree species in the genus *Styrax* in China. At present, there is a lack of systematic classification and sorting of *S. japonicus* cultivar resources in China, which not only affects the comprehensive evaluation of the resource value of various varieties and the establishment of the regeneration system of variety clones, but also seriously restricts the in-depth application and promotion of its resources. This study studied the cultivated metamorphic germplasm resources of *S. japonicus* through field investigation and literature review, compiled the test guidelines for new varieties of *S. japonicus* in China,

constructed the application value evaluation system of *S. japonicus* resources, and studied the genetic diversity of cultivated varieties through codon preference and microsatellite (SSR) markers. The main findings are as follows:

1. The cultivars of *S. japonicus* are abundant, and a relatively complete database has been obtained through analysis and comparison, and a classification and retrieval system has been established. In this paper, a database of *S. japonicus* was established, including 44 varieties and 39 phenotypic trait indicators, and 37 test traits, 17 standard varieties and 5 grouped traits were finally screened through correlation analysis, principal component analysis and cluster analysis. And the DUS test guide for *S. japonicus* varieties and the *S. japonicus* germplasm classification search table were compiled.

2. A practical evaluation system was established after analysis and verification. Based on the principle of analytic hierarchy process, the application characteristics of *S. japonicus* were summarized, and 13 specific evaluation indexes were used from four aspects: ornamental, ecological characteristics, economic value potential and resource quantity, and an AHP model suitable for the comprehensive evaluation of *S. japonicus* plants was preliminarily established. A total of 44 *S. japonicus* cultivars were comprehensively evaluated and divided into four application categories.

3. *S. japonicus* has a rich variety of cultivated variants, and its intrinsic factors are derived from its obvious codon preference. Through the base use pattern and genesis of the codon in the chloroplast genome of *S. japonicus* and the screening of the optimal codon, the optimal codons affecting the population were finally determined to be UUG and CGA.

4. *S. japonicus* cultivars have a high level of genetic diversity and have the potential for further differentiation. Through the investigation and sampling of *S. japonicus* 'Zhudan', 60 samples from 6 cultivation bases with 3 different environmental attributes were used as materials, and 4 pairs of microsatellite primers were screened to calculate the genetic diversity index of the samples, which showed that *S. japonicus* cultivars have a high level of genetic diversity, and due to the influence of internal genetic factors and external regional climate characteristics, the morphological presentation of *S. japonicus* cultivars under different environmental attributes will be different, and there is a possibility of re-variation.

Keywords: *Styrax japonicus*; cultivar; DUS test guidelines; genetic diversity; Styracaceae